

CONTRIBUTION TO NMFS ANNUAL REPORT

Recent HL physiological studies using captive skipjack tuna show fish to be limited by water temperature and dissolved oxygen concentration. Skipjack tuna of all sizes appear to need water warmer than about 18°C with >3.5 ml/liter (5 ppm) dissolved oxygen; these two factors seem to define lower limit of normal habitat. Tunas are equipped with well-developed heat exchangers in blood circulatory systems that conserve body heat--freshly caught skipjack may have muscle temperatures 11°C above surrounding water. High internal temperature may limit ability to tolerate warm water--muscle protein may be damaged by internal temperatures above 35°C. Juvenile and adolescent skipjack can tolerate water 26°C or more and so can inhabit entire tropical Pacific, but adults may be limited. If they cannot find water cool enough and with enough oxygen in large areas of eastern Pacific, this would explain why only small skipjack are found there.

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